



Is Planning a Project Using 100
CFM Worth Your While?



Capital Costs

Engine Supplier	\$ 155,000
Mechanical Contractor	133,000
Sulfur Treatment	96,000
Electrical Contractor	120,000
Siloxane Treatment	209,000
CMCMUA as G.C.	124,000
Consultants/Studies	<u>21,000</u>
	858,000
Grant	- <u>285,000</u>
	\$ 573,000



Cost 3/7/07 – 6/19/08

Stack Tests/Emission Testing	\$ 13,900
Parts/Repairs/Service	20,000
50% of Electrician	50,000
Improvements	<u>10,000</u>
	\$ 93,900



Revenue:

Renewable Energy Certificates	\$ 30,200
Heat Recovery	10,000
Avoided Cost	53,600
On-Site Sales	167,000
Grid Sales	49,700
Carbon Credits	<u>71,500</u>
	\$ 382,000



Pay Back Calculator

Annual Revenue \$ 305,600

Annual Costs - \$ 75,100

Annual Net Revenue \$ 230,500

Capital 573,000 / 230,500 = 2.5 years



Environmental Credits

REC's	3/07 → 5/08	\$ 12.11 / Rec
	5/08 → 5/10	\$ 22.75 / Rec

Carbon Credits

First Sale	2/08	\$ 3.00 / Metric Ton
Second Sale	5/08	\$ 6.60 / Metric Ton



TIMELINE STRESS

	Submission	2/03/06
Air Permit	Preconstruction	5/15/06
	Final	7/11/06
Engine Bid		3/21/06
Siloxane Bid		5/09/06
Sulfur Bid		5/09/06
Completion		2/2007
Engine Start-Up		3/07/07



Landfill Factoids

Began 1984

Footprint 93 Acres

Waste In Place \approx 4,000,000 Tons

Current CFM Production 1,100 \rightarrow 1,300 cfm

Projected within 10 years \rightarrow 1,500 cfm

Average Methane Content 52% \rightarrow 55%



Project Going Forward

“Modular Design”





Engine Bid

2 – Waukesha – Rich Burn Engines

Rated @ 150 kw each



KRAFT POWER
THE POWER OF PERFORMANCE.

KP150

58314







Sulfur Scrubber

Bid to Reduce from 2,000 ppm Sulfur
to < 25 ppm

6 inches water column pressure loss across
vessel

180 day change out period



Results

Still have yet to change out media and
expect 3 years before change out

Installed continuous read monitor – never
risen above .09 ppm.





Siloxane Scrubber

Reduce from 1 ppm to 5 ppb

(we actually use 25 mg/m³) as change out period
criteria

Must exit siloxane scrubber with minimum 5 psig

120 day change out period



Carbon Based Two Vessel System

Lead Lag Set-up

Monthly Laboratory Testing for Siloxane

Change outs being driven by Pressure drops
@ 40 day average





Blower Skid

2 Blowers for Redundancy, 10 HP each

3 Stage Heat Exchanger

Particulate size down to .3 microns







Dependability

Up Time:

Potential System Hours	22,272
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Total Engine Hours	20,648
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% Up Time	92.7%
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Real World Efficiencies

Engines Ran 20,648 hours

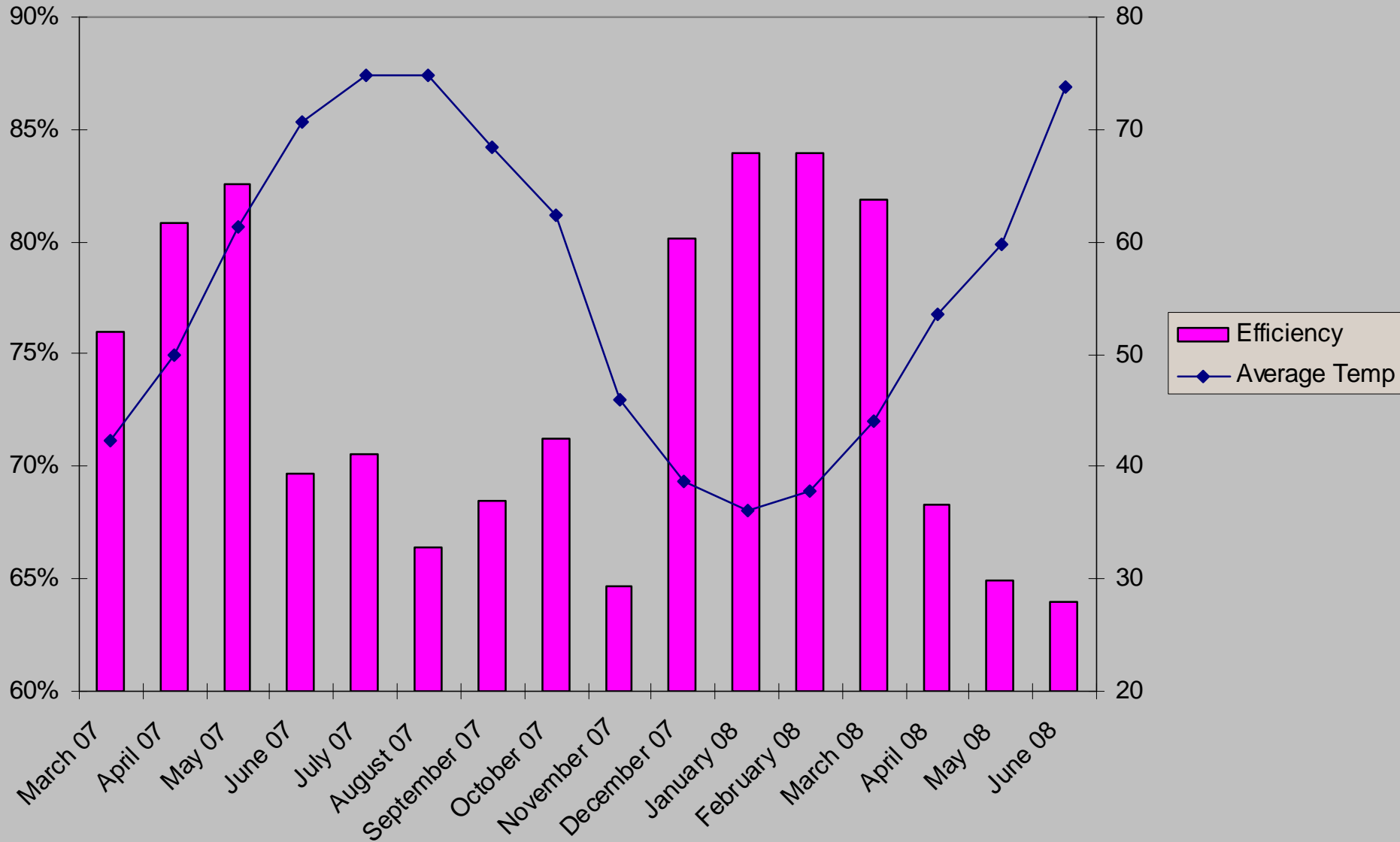
Produced 2,293,786 Kwh

Engines Rated @ 150 kw

$$2,293,786 / 20,648 = 111.1 \text{ Kw}$$

$$111.1 / 150 = 74.1\%$$

Efficiencies vs. Temp





Up Grades

1. Exterior Cooler
2. Secondary Carbon Filter
 - Primary Filter 3 microns
 - Secondary Filter .2 microns







3rd Engine

June 18th 2008 – Started 3rd Engine

No Grant Funding

Treatment Skid rated @ 150 cfm

Each Engine Using an Average of 47 cfm





Conclusions

1. Project a “Money Maker”
2. Environmental credits add 27% to Bottom Line
3. Magnitude of Scale probably excludes 3rd Party Project, most likely “In-House”